

CONNECTION

The Official Newsletter of Zhejiang University

Issue 13

Sept.15, 2019



*Seeking Truth
Pursuing Innovation*



www.zju.edu.cn/english



ZJU team defends the top prize at
Robocup 2019 *P. 06*



New record with entanglement of
atomic schrödinger-cat state
P. 08-09

Global experiences in the summer
P. 12-15

CONTENTS

ZJU NEWSROOM 03

RESEARCH HIGHLIGHTS 08

NEW RECORD WITH
ENTANGLEMENT OF ATOMIC
SCHRÖDINGER-CAT STATE

CAMOUFLAGE FOR ANTI-CANCER
DRUGS

ACTIVE TUMOR PENETRATION BY
POLYMER CONJUGATE

SPOTLIGHT ON 12

MESSAGE FROM THE EDITOR-IN-CHIEF

As the new semester approaches, I hope you all had a splendid summer vacation. During the summer vacation, our students have plenty of opportunity to study or research abroad. At the same time, we welcome international students to come to ZJU, and to understand China more. Global experiences help them develop independence, maturity and other important life skills that enhance their professional and personal life.

Here in this edition, I am also proud to share with you the wonderful performance of our students on the global stage: ZJU team defended the top prize at RoboCup 2019 and won four gold and four silver medals at the 11th Chinese Vocal International Competition. You will also find the interesting breakthroughs ZJU scientists have recently made in quantum entanglement, anti-cancer drugs, and tumor penetration.

As always, we wish you pleasant reading and hope you are able to share your thoughts with us!

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ZJU NEWSROOM

Public Engagement

ZJU strengthens ties with Hangzhou city

The Work Conference on Deepening Cooperation between Hangzhou City and ZJU in the New Era was held in Hangzhou Civic Center on June 24.

DAI Jianping, executive vice mayor of Hangzhou Municipal Government and WU Zhaohui, ZJU president signed an agreement on deepening comprehensive strategic cooperation, which covers 93 items in "2019-2020 Action Plan" and 66 items in "Five-year Work Plan".

"We should develop new domains, media, platforms and projects and cooperate with each other at a higher level," said ZHOU Jiangyong, secretary of the CPC Hangzhou Municipal Committee.

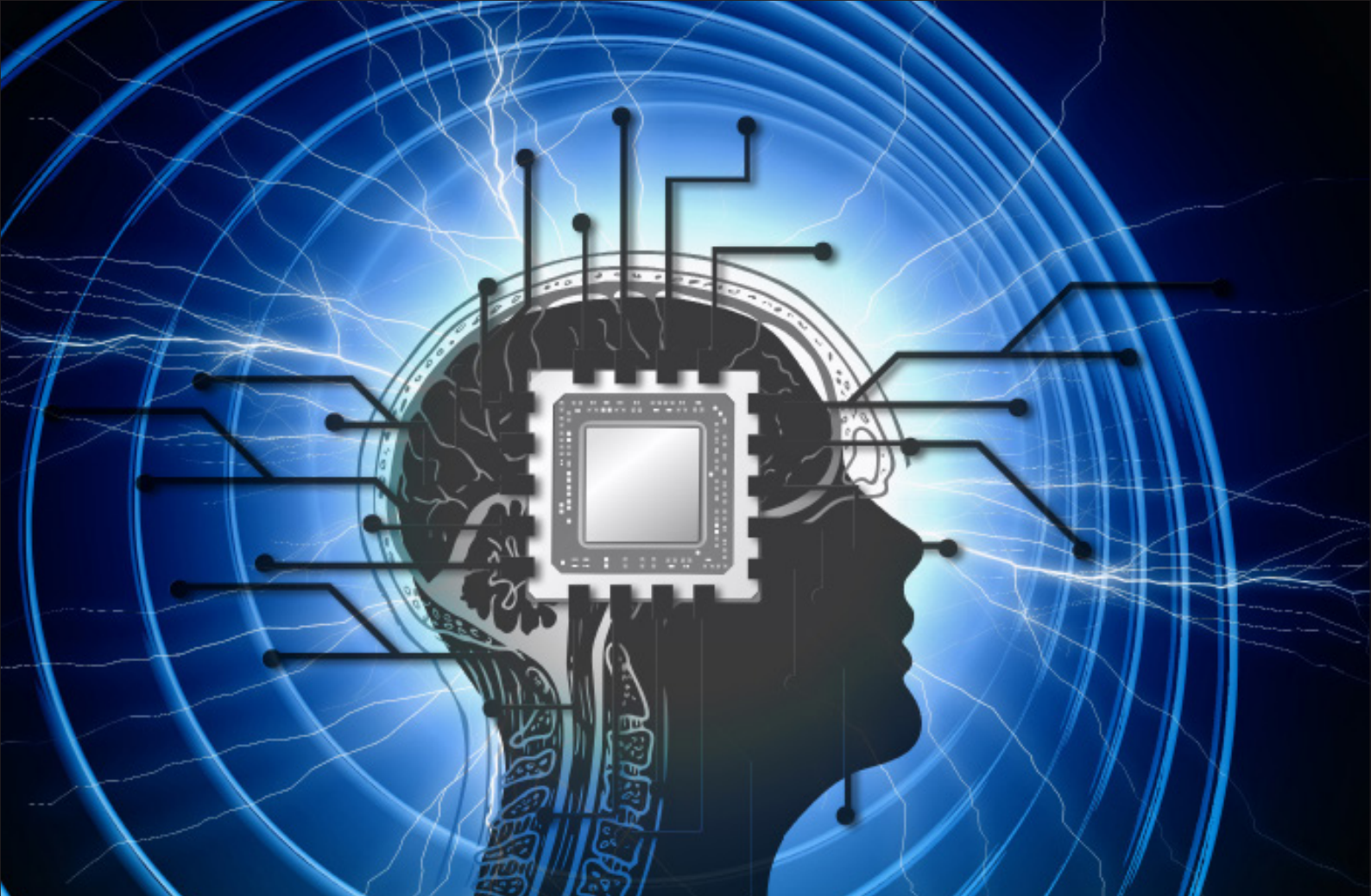
ZJU and Ant Financial deepen partnership

On July 4, ZJU and Ant Financial Services Group signed a strategic partnership agreement which layouts the plan for commercial modes, technological innovation and talent cultivation in the era of digital economy.

"Sci-tech companies thrive on deep cooperation with universities. They can also offer a great platform for talent training and learning. This cooperation is very concrete and substantial," said JING Xiandong, CEO of Ant Financial.

Future plans include the preparations of the financial technology research center, the high-caliber bank, the smart campus, international exchange programs and Ant Financial-ZJU internship initiative.





Research

Why do full-up mice gorge themselves?

A well-fed mouse is dozing off. All of a sudden, a yellow optical fiber in its brain evokes its cravings and it starts to wolf down.

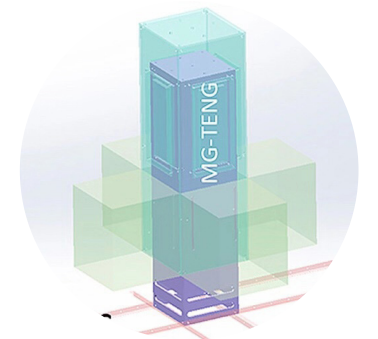
This is a scene in the laboratory at ZJU's School of Medicine. Neurologist WANG Hao discovers a set of neurons which can "unplug" mice's feeding behavior in the July 16 issue of *Cell Reports*. WANG Hao et al. discover that suppressing the activity of GABAergic cells in vPAG can prompt feeding behavior in well-fed mice. In contrast, optogenetic activation of these cells interrupts food intake in starving mice.

The findings may shed light on pharmaceutical treatment for obesity.

Efficient power output generated from low-frequency ocean wave

The research team led by Prof. ZHANG Dahai at ZJU's Institute of Ocean Engineering and Technology published an article in the journal of *Nano Energy*. This study focuses on a multi-grating triboelectric nano-generator (MG-TENG) which harvests low-frequency ocean wave energy.

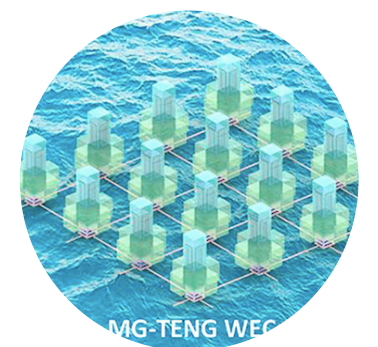
The MG-TENG based wave energy converter shows strong power output capability with an instantaneous power output of $54 \mu\text{W}$ and a maximum output density of 4.2 mW/m^2 under the 8 cm and 0.5 Hz wave condition. It greatly facilitates the power supply system in ocean engineering.



Rotational freedom of mixed ligands improves solubility of nanocrystal-ligand complexes

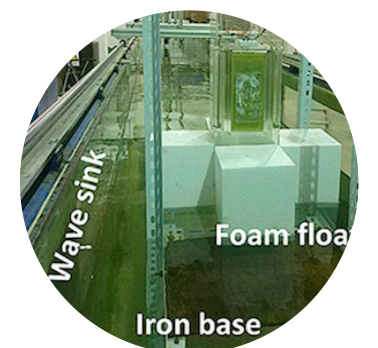
PENG Xiaogang and KONG Xueqian at ZJU's Department of Chemistry elaborate the first dynamics of surface ligands using advanced NMR technology in *Nature Communications*.

The mathematical model based on the NMR-derived ligand partition and dynamics predicts that the unusual solubility of nanocrystal-ligands complexes with mixed ligands is magnificently higher than that of nanocrystal-ligands complexes with pure ligands. The molecular analysis in this work serves as a theoretical blueprint for promoting entropic ligands in the field of colloidal nanocrystals.



Ten big questions on "Consciousness, Brain and Artificial Intelligence"

In April 2019, ZJU held a round table forum on "Consciousness, the Brain and Artificial Intelligence". Ten challenging cross-disciplinary issues are raised from the perspectives of computer science, neuroscience, psychology and sociology.



International

What's happening

Prof. HU Hanlan with the Center for Neuroscience, School of Medicine becomes the first Asian scientist awarded the Twelfth IBRO-Kemali International Prize for contribution in the field of basic and clinical neurosciences.

Prof. CHEN Liu with Department of Physics is selected as the 2019 Laureate of Subrahmanyam Chandrasekhar Prize of Plasma Physics for his seminal contribution to magnetic fusion and space plasma physics.

BI Lei, principal researcher at School of Earth Sciences receives the 2019 IAMAS Early Career Scientist Medal Award in recognition of his research on light scattering by non-spherical and inhomogeneous particles in atmospheric radiative transfer.

SHEN Chenjie, a PhD student specializing in physiological pathogenesis of neurological diseases at School of Medicine receives the Ray Wu Prize 2019 for excellence in life sciences.

ZHAO Yujie, an undergraduate at School of Materials Science and Engineering wins the ZwickRoell Science Award 2018 for her research on in-situ voltage impedance monitoring.

ZJU team defends the top prize at RoboCup 2019

RoboCup 2019, an international competition showcasing the cutting edge of robotics technology was held in Sydney, Australia on July 7. ZJU clinched the robot soccer championship after defeating German team ER-Force 1-0. It is the fourth time that ZJU has claimed the top prize.

“Our team has around 20 members from different majors, including computer science, mechanical engineering and automation. All robots are designed on our own from machinery, electro circuits, software to calculation,” said HUANG Zheyuan, team leader.



ZJU invited to attend summer Davos 2019

ZJU was invited to the New Champions of the World Economic Forum 2019 on July 1–3. Themed on “Leadership 4.0—Succeeding in a New Era of Globalization”, Vice President WANG Lizhong attended a panel discussion on “Evolving Collaborative Innovation Models”.

Participants seek to achieve sustainable and inclusive growth in a global economy since the Fourth Industrial Revolution. “ZJU looks forward to entering into multi-lateral partnership to contribute more to mankind,” said WANG Lizhong.

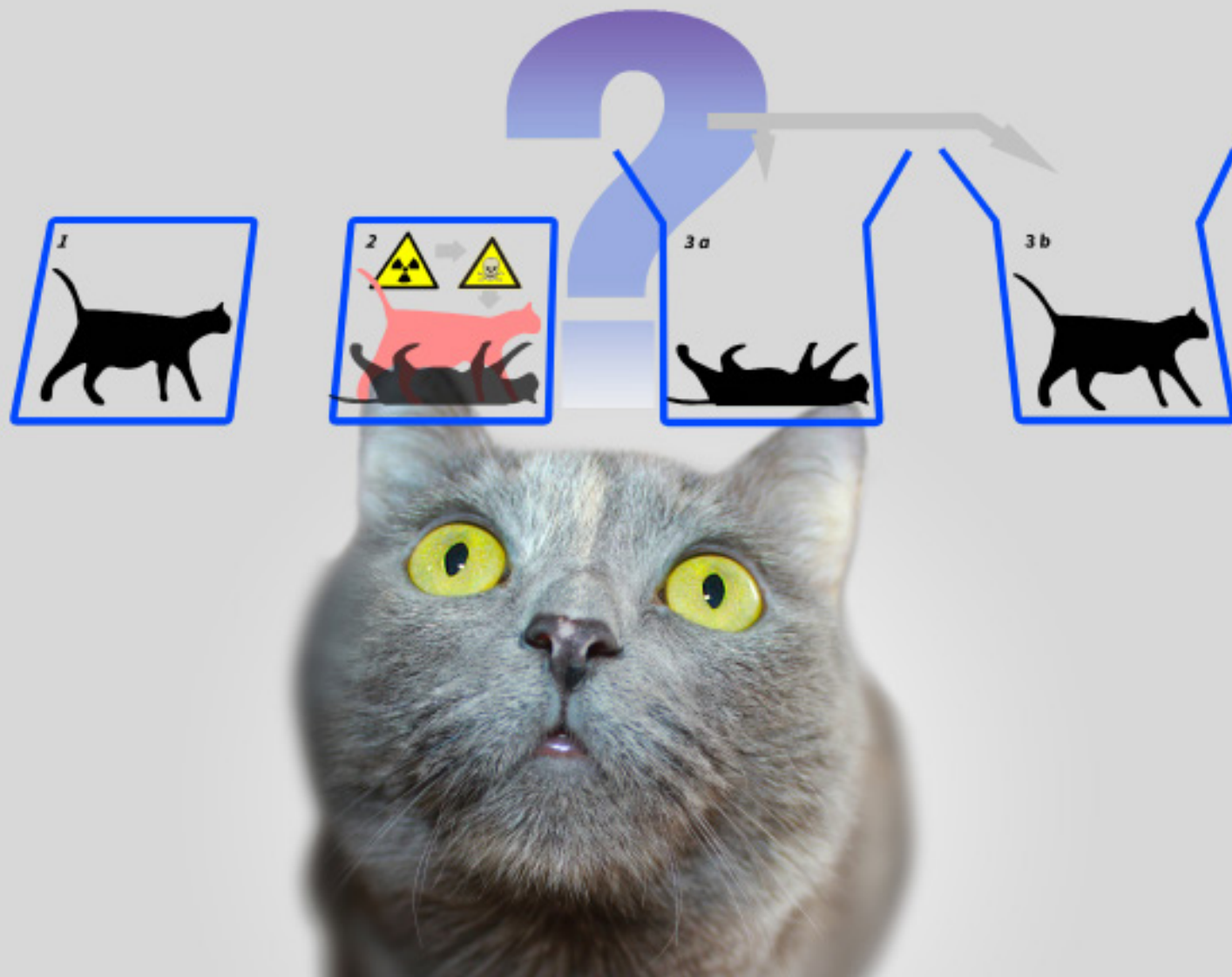


ZJUers win four gold and four silver medals at the 11th Chinese vocal int'l competition

The Graduate Art Troupe of ZJU clinched four gold and four silver medals for their spectacular performance at the 11th Chinese Vocal International Competition on July 26-27 in Singapore.

The Competition attracted approximately 800 contestants this year. JIANG Chaohui of the Graduate Art Troupe garnered the highest prize—Special Gold Award. The chorus group won the gold and the silver medals.





RESEARCH HIGHLIGHTS

| New record with entanglement of atomic Schrödinger-cat state

Physicists have experimentally demonstrated quantum entanglement with 20 qubits on a superconducting circuit, surpassing the previous record of 12 entangled superconducting qubits.

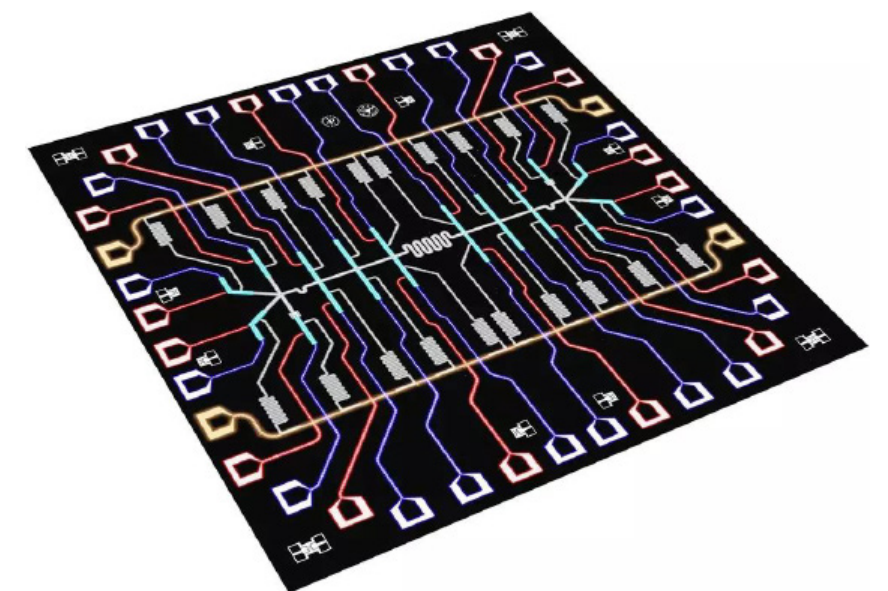
Lead researcher WANG Haohua and co-workers at Zhejiang University, the CAS Institute of Physics, the CAS Institute of Automation and Beijing Computational Science Research Center, have published a paper on their work in a recent issue of Science.

Quantum computing relies on qubits which point to 1 or 0 to represent information. But qubits can achieve a mixed state called "superposition" where they are both 1 and 0 at the same time. Once the number of qubits adds up to 50, the quantum computer can surpass the supercomputer in computing capabilities. "Our chip is marked by its remarkable ability to interconnect all qubits, thereby promoting its working efficiency. This can account for the ground breaking entanglement of 20 qubits," says one of the researchers.

By engineering a one-axis twisting

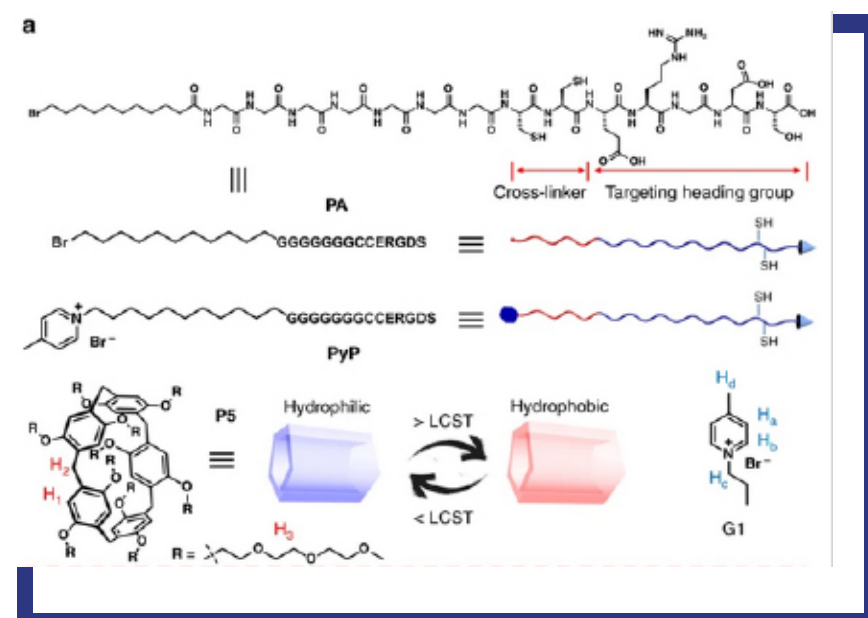
Hamiltonian, the system of qubits, once initialized, coherently evolves to multicomponent atomic Schrödinger cat states within merely 187 ns. This is the hallmark of the ability to entangle these qubits.

With all-to-all connectivity and programmable qubit-qubit couplings, this 20-qubit superconducting quantum processor sheds light on large-scale quantum computing. It also demonstrates the potential of an all-to-all connected circuit architecture for exploring profound quantum many-body physics.



Superconducting quantum processor with false-color circuit image showing 20 qubits (line shapes in cyan labeled clockwise from 1 to 20) interconnected by a central bus resonator B (gray).

Camouflage for anti-cancer drugs



Prof. HUANG Feihe and Prof. MAO Zhengwei with ZJU and Dr. YU Guocan with the American National Institutes of Health developed a new drug delivery system which can effectively encapsulate a photosensitizer for photodynamic therapy in the June 3 issue of Nature Communications.

Pillararene-based supra-amphiphiles can bridge the gap between controllable self-assembly and simple synthesis by non-covalent interactions. To better control the encapsulation of drugs and the morphology of nanostructures, HUANG Feihe et al. pioneers in introducing pillar[5]arene bearing ten tri(ethyleneoxide) groups (P5) for its unique thermo-responsive property and strong binding affinity for cationic guests.

A supramolecular peptide can be constructed via pillar[5]arene-based host-guest recognition, thereby streamlining the peptide modification process and promoting the controllability of the self-assembly behavior. Due to peptide sequences on the exterior surfaces and hydrophobic cores of self-assemblies, the nanoparticles formed from the supramolecular peptide can encapsulate a photosensitizer.

The inherent targeting capability and the supramolecular strategy tremendously enhances the photodynamic therapeutic efficiency. It holds enormous promise in precise cancer therapy and peptide modification.

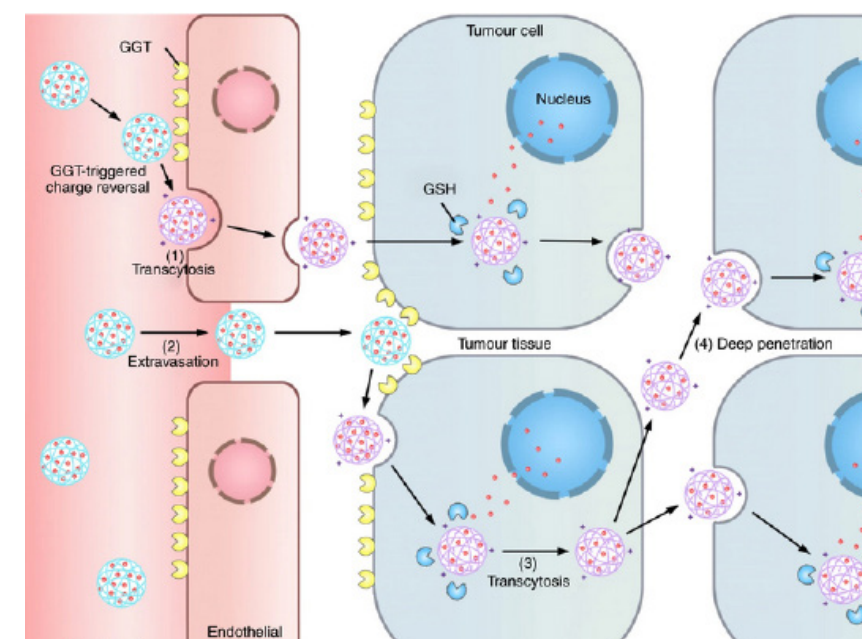
Active tumor penetration by polymer conjugate

At present, clinically-used nanomedicines can do nothing to improve their therapeutic efficacy significantly, one of the major reasons is that nanomedicines fail to penetrate into every cancer cell in tumors in a "door-to-door" manner.

The team led by Prof. SHEN Youqing with ZJU's College of Chemical and Biological Engineering and Prof. GU Zhen with UCLA's California NanoSystems Institute and Center for Minimally Invasive Therapeutics published their research on active penetration of nanomedicines into tumor cells in the July 01 issue of Nature Nanotechnology.

Inspired by the endothelial cell caveolae-mediated transcytosis that actively transports cargos across the endothelium, SHEN Youqing et al. demonstrate that the endothelial cell transcytosis may actively transport nanomedicines across the capillary wall into tumor tissues. Furthermore, this ATP-dependent transcytosis process could also lesson passive diffusion and make nanomedicines actively infiltrate into distal cells. Authors indicate that the γ -glutamyl transpeptidase responsive camptothecin—a polymer conjugate can actively infiltrate into the tumor tissue through transcytosis.

This bioresponsive drug delivery strategy can successfully circumvent many biological barriers in "CAPIR" (circulation, accumulation, penetration, internalization and release) cascade, thereby opening up a new avenue for nanomedicines design.



The neutral long-circulating nanomedicine is converted into a cationic one by the enzyme on the luminal endothelial cell surface, which triggers the AMT of the nanomedicine across the endothelium.



SPOTLIGHT ON: STUDENTS

■ "Feel, learn and think" with the 8th Idea Explorer Summer Camp

"The world of future cannot be understood without understanding China. If you want to understand China within a short period of time, this is the program for you," said a participant at the closing day of ZJU's 8th Idea Explorer Summer Camp.

Centered on the theme "Start A Business In/With China", the 8th Idea Explorer Innovation & Entrepreneurship Global Summer Camp went with three dimensions — "Feel, Learn and Think". Students experienced how life is like in China by joining in Chinese traditional activities and exploring Hangzhou. "I think this summer camp is truly worthwhile, it changed my perspective about China, showed me a distinctive Chinese lifestyle, and helped me make friends from all over the world," said a participant majoring in engineering.

The "Learn" section include three parts — "Start A Business In/With China", "Start A New Business" and "Opportunity & Challenge". After listening to lectures by professors and experiencing the innovation and entrepreneurship in

companies, the 33 participants from 14 countries designed their own creative business plans. At the closing ceremony of the summer camp, each group presented a creative business proposal based on what they have learned in the past weeks. The group "Phoenix Corp" won the title of "Best Idea Explorer".



■ Sino-Swiss workshop for sustainable architecture

During this two-part workshop, participants exchanged ideas on innovative solutions to current day architectural problems and dealt with a wide range of issues. Amongst these hard-pressed issues were the cultural and geographical considerations that modern day architects tackled when designing buildings of the future. With sustainable architecture as the over arching theme, students came up with some interesting ideas that may very well be the next architectural icon.

SPOTLIGHT ON: STUDENTS



ZHIYUAN global practice program

Coordinated by the Graduate School of Zhejiang University, the ZHIYUAN Global Practice Program provides ZJU students with the opportunity to develop cross cultural communication skills through overseas programs. This summer, a total of 56 graduate students took part in the program. They travelled to seven countries (Thailand, Brazil, Republic of Serbia, Republic of Indonesia, the Kingdom of Cambodia, the Arab Republic of Egypt, the United Arab Emirates) in the Belt and Road region and had the opportunity to share their experiences of China while learning from the local language and culture.



A taste of Cambridge in the summer

A group of 20 graduate students from Zhejiang University spent nearly two weeks in a summer academic exchange program at the University of Cambridge from July 20 to Aug. 2. With the theme of science, engineering and humanity, they explored educational, research, cultural, natural and historic sites and joined in various activities around the town of Cambridge.

"I used to think that urban planning was a kind of art with a little consideration about practicability. However, from the lectures today, I learnt that every design comes from thorough investigation and computation. What's more, the urban design nowadays especially values sustainable and green development, not only just to satisfy the basic needs of people."

ZANG Jiali, College of Information Science and Electronic Engineering

"More and more advanced techniques are used in painting conservation and art historical research nowadays. With the help of new instruments, we can restore the painting to what it looked like hundreds of years ago. I feel science and technology can help us see things in a more holistic way."

ZHANG Xiao, School of Economics